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Examining the Effects of Corrosive Household Chemicals on Bone and Tissue

Trish Dowell

Western Oregon University, kharma775@yahoo.com

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Citation

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ABSTRACT

The ways in which perpetrators attempt to dispose of their victims range from carelessly leaving the corpse in a shallow grave to total annihilation of the body through fire or even chemical means. Mexican-American drug cartels have been known to dispose of their victim’s bodies by placing the corpses in containers and adding strong chemicals such as acid or lye to attempt to completely dissolve the bodies (Palmer, 2009). Even in popular media, such as books, movies, and television, disposal of bodies via the use of strong chemicals is a prevalent method. For example, in the second episode of the show Breaking Bad, the main characters attempt to dispose of a body using a bathtub and hydrofluoric acid. Unfortunately for the characters, the acid is so strong, it destroys the corpse, as well as the bathtub, the floor supporting the tub, and the floor below (Hilmesmäki, 2008).

With all this media supporting the use of chemicals as a means of body disposal, I wondered just how accurate the information was. I decided to research a variety of corrosive, easily obtainable household chemicals and test how well each one would destroy bone and soft tissue in a short period of time (24 hours). I chose to work with carbonated soda, bleach, sodium hydroxide, potassium hydroxide, and sulfuric acid. I briefly considered testing hydrofluoric acid, but since even a small amount onto your skin can become fatal, I decided to forgo that particular test. I hypothesize that the chemicals will offer a variety of results. The soda and bleach will likely have an effective in destroying soft tissue and bone. Sulfuric acid was considered the most dangerous, and potassium hydroxide will likely cause slight loss of mass to the soft tissue and bone. I believe that the sulfuric acid will cause the most significant degradation of all the chemicals.

INTRODUCTION

In popular media, criminals attempt to dispose of their victims by using various chemicals to dissolve the corpses. This research investigates the effects of household chemicals on the degradation of bone. Verterebrae from a domestic pig (Sus scrofa domesticus) will be immersed into five corrosive agents: drain-cleaner, lye, bleach, oven-cleaner, and cola. Tap water will serve as the control. Color, size, and weight of bones will be documented over time. I expect drain-cleaner, cleaner, and cola. Tap water will serve as the control. Color, size, and weight of bones will be documented over time. I expect drain-cleaner, lye, and oven-cleaner to thoroughly degrade the bone, cola to cause mild degradation, and bleach and tap water to produce the least degradation.

MATERIALS

In a review of the literature, studies indicated that hydrofluoric acid is very effective in destroying soft tissue and bone. Sulfuric acid was considered the second most corrosive chemical (Hartnett, Kristen M., Laura C. Fulginiti, and Frank Di Modica. 2009/12/soluble_dilemma.html). Sodium hydroxide and potassium hydroxide are often employed by assassins as means of body disposal. One criminal, Adolph Laugter, disposed of his wife’s body by placing it into a boiling vat of lye in 1897, and then burned what was left (Palmer, 2009).

Based on my findings and the availability to readily purchase the chemicals, I decided to conduct my experiment using the following: Carbonated soda, Bleach, Potassium Hydroxide, Sodium Hydroxide, Sulfuric Acid and Water (as a control). I then conducted research on the MSDS (Material Safety Data Sheets) for each chemical to make sure I was taking the proper safety precautions (3M Company. 2012). I gathered supplies and materials, some of which I had at home and some I purchased.

METHODS

Specimen 1: H2O (Control)

I cut the pig vertebrae into pieces, trying to make them as similar in size as possible, leaving the flesh intact. Each specimen measured between 5-6” in length, 2.5-4” in width, and 1-2” in height. I washed, rinsed, dried, and labeled the buckets. I then measured each piece of vertebrae and recorded the height, width, and length of each specimen. I also took pictures and noted visual appearance. I placed each specimen into a labeled bucket and, making a note of the time; I added each corresponding chemical and placed the buckets in separate safe locations outdoors. I photographed the specimens in the chemicals and covered the buckets with poly sheets. After 12 hours I photographed, visually inspected, and recorded the results. I then placed the specimen back into their chemical solutions and returned them to their holding areas. After another 12 hours I photographed, visually inspected, and recorded the results. The results were made over a period of 24 hours.

RESULTS

Specimen 2: Carbonated Soda

Figure 3: Beginning specimen

Weight: 4 oz

Measurements: 6.5”x3.5”x0.5”

Specimen 3: Bleach

Figure 4: Bleach 12:22 pm

Weight: 5 oz

Measurements: 5.7”x3.5”x0.5”

Specimen 4: Potassium Hydroxide

Figure 5: Potassium hydroxide after 24 hours

Weight: 6 oz

Measurements: 5.5”x4”x1.5”

Specimen 5: Sodium Hydroxide

Figure 6: Sodium hydroxide after 24 hours

Weight: 7 oz

Measurements: 5.5”x3”x1”

Specimen 6: Sulfuric Acid

Figure 7: Sulfuric acid 12:43 pm

Weight: 8 oz

Measurements: 5.5”x4”x1.5”

CONCLUSIONS

The overall results of this experiment verified my hypothesis. Specimen 1 in the H2O control (figure 1-6) showed very little degradation, just a slight increase in weight. Specimen 2 in the soda (figures 10-16) and specimen 3 in bleach (figures 17-23) showed some discoloration, but no appreciable degradation of bone or tissue. Specimen 4 in potassium hydroxide (figures 24-29) showed a slight decrease in mass and showed a slight degradation of the tissue. Specimen 5 in sodium hydroxide (figures 30-35) showed a slight decrease in weight and had more obvious tissue degradation, but very little effect on the bones. Specimen 6 in sulfuric acid (figures 36-41) showed the most appreciable decrease in mass and weight, and close to half of the specimen was visibly degraded. Given another 48 hours, I believe the entire specimen would have completely dissolved.

The results indicate that some chemicals may be used effectively by criminals to dispose of a body. The sulfuric acid is particularly potent because of its availability to the public. It is possible that criminals will continue to use this effective and easy to obtain chemical. Law enforcement and legislative groups should consider repealing the laws in order to pursue this dangerous substance to help track these dangerous criminals.

REFERENCES

Palmer, Brian. 2009/12/soluble_dilemma.html

